

# Report on results of the International Workshop on Marine and Atmospheric Sciences in West Africa



B. Fiedler, K. W. Fomba, A. Martins, and A. Körtzinger



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**Lead beneficiary:** GEOMAR

**Lead authors:** Björn Fiedler, bfiedler@geomar.de

**Contributors:** K. Wadinga Fomba, fomba@tropos.de; Albertino Martins, Albertino.Martins@indp.gov.cv; Arne Körtzinger, akoertzinger@geomar.de

**Submitted by:** Veronika Jorch, veronika.jorch@thuenen.de

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## Executive Summary

Deliverable 6.2 reports about results of an international workshop which was held in November 2017 in Cabo Verde within the framework of the EU H2020 project SEACRIFOG. The workshop focussed on a concept, the so-called “Three-Spheres Concept”, which we developed in WP6 in order to synergistically connect the local research agenda of an African country with global research programmes and regional capacity development efforts in a sustainable way. The workshop was embedded into the “International Workshop on Marine and Atmospheric Sciences in West Africa” which was held in November 2017 at the Ocean Science Centre Mindelo (OSCM) in Cabo Verde. For the combined workshop, a total of 163 participants represented 25 nations (13 African, 8 European, and 4 North- and South American countries). The three pillars of the concept (national, regional and global research and capacity development spheres) were discussed in dedicated sessions. This report summarizes the discussions as well as the cross-cutting topics of the three pillars.



## 1 Introduction

The overall task of WP6 is to explore the possibility to synergistically overlap three relevant “spheres” in marine and atmospheric research in Cape Verde and West Africa (national, regional, and global research and capacity development sphere) and to formulate a strategy for its implementation as a demonstration case.

### Objectives:

- Explore the possibility to synergistically overlap the following three relevant “spheres” in marine and atmospheric research in Cape Verde and West Africa (Fig. 2):
  - **Global/International Research Sphere:** State-of-the-art marine and atmospheric research according to highest international standards exposing and connecting the “National Research Sphere” to the international community and science.
  - **National Research Sphere:** Support the national research capabilities to enhance marine and atmospheric research on local/regional topics of high socioeconomic relevance. Assure high scientific standards through support and knowledge exchange with the “International Research Sphere”
  - **Regional Marine Human Capital & Capacity Development Sphere:** Support the development of a West African human capital and capacity in the Mindelo hub. Embed education and training into the context of active national and international research activities (TTR – Training-Through-Research).
- Contribute to “Aim 3” of SEACRIFOG by assessing the possibility of implementing this “three-spheres-approach” in a sustainable way and estimating the synergy potential to all parties involved.

This document reports about task 6.2 under which an international workshop was organized in Cabo Verde in order to bring local and international experts together to discuss the “Three-Spheres Concept” and to obtain recommendations for it.

In the following sections the workshop is described in more detail and relevant details for each sphere are being discussed subsequently.



## 2 Three-Spheres-Workshop in Cabo Verde

In order to maximize the success of the SEACRIFOG workshop it was embedded into the “International Workshop on Marine and Atmospheric Sciences in West Africa” which was held in November 2017 at the OSCM in Cabo Verde. Both workshops benefitted from each other due to increased attention, enhanced visibility and relevance and more efficient logistics. The workshop was attended by 163 participants representing 25 nations (13 African, 8 European, and 4 North- and South American countries).

Two other international projects were present who had previously gained significant experience in multilateral cooperation in West Africa, thereby providing valuable input to the workshop: The EU FP7 project PREFACE (Enhancing prediction of tropical Atlantic climate and its impacts) as well as the trilateral German-French-Africa research project AWA (Ecosystem approach to the management of fisheries and the marine environment in West African waters).

The three components of the “Three-Spheres Concept” were covered in separate sessions and in each session local stakeholders and international participants were present.



*Figure 1 – Group photo of workshop participants of the International workshop on Marine and Atmospheric Sciences in West Africa.*

### 2.1 Global/International Research Sphere

The workshop started with contributions from international participants that have conducted research in West Africa or are still engaging in research in the region. Examples from the two existing research infrastructures in Cape Verde – the Cape Verde Atmosphere Observatory (CVAO) and the Cape Verde Ocean Observatory (CVOO) – were presented and set into context of international research programmes. CVOO is a bilateral initiative which is led by the Cabo Verdean Instituto Nacional de Desenvolvimento das Pescas





(INDP) and the German GEOMAR Helmholtz Centre for Ocean Research Kiel. CVAO is a trilateral initiative in which institutions from UK, Germany and Cabo Verde are jointly operating the observatory.

Furthermore, future initiatives of international programmes with potential relevance for the West African region were presented. For instance, plans were presented to establish an ocean-atmosphere interaction observatory as a third observatory that would be tailored specifically at physical, chemical and biological interaction and coupling between surface ocean and lower atmosphere. This initiative is supported by the international SOLAS Programme (Surface Ocean Lower Atmosphere Study) and will seek financial support from the German Helmholtz Association.

The session also helped the wide spectrum of local and regional stakeholders to better understand the international scope of ongoing research efforts in Cabo Verde and also to explore potential connections between local research needs and international research agendas.



*Figure 2 – Workshop participants listening to the presentations in the OSCM hangar.*

## 2.2 National Research Sphere

For the national research sphere several sessions were organized, one was led by the AWA and PREFACE projects. Participation of these projects in the workshop aimed at creating synergies between them and existing or emerging Cabo Verdean initiatives. Coastal countries in West Africa are all facing serious problems with regard to overfishing and also regarding other ecosystem changes due to climate change. Consequences of these phenomena were discussed between managers and scientist from the sub-region during the session. One of the objectives of AWA is to support associated partners in West Africa in improving fisheries management and to propose specific actions. This approach is very multidisciplinary as in AWA ecologists, biogeochemist, physical oceanographers, socialist scientists, economists and climatologists work closely together. The long-term goal is the development of a multidisciplinary observatory that determines key parameters of the West African ecosystem and also simulates and predict



potential future changes. This session of this workshop aimed to enable West African countries to establish in the long-term a sustainable fisheries management system which is based on consolidated knowledge about biological, ecological and socio-economic aspects.

Besides scientific results that were presented during this session, results of the UN Ocean Conference were presented and the importance of the Sustainable Development Goal 14 “Life under water” was emphasized (SDG 14) and set into the regional context.

A special focus was put on the Macaronesian region with respect to the local sphere. The Macaronesian region covers a large ocean area and consists of the following four archipelagos: Azores, Madeira, Canary Islands and Cabo Verde. All of these are of volcanic origin which causes some similarities in ecosystem structure. However, archipelagos are located in different climatic zones which explains differences in their ecosystem and also have distinct features in terms of their biogeography. Regardless of these differences, all archipelagos are facing similar socio-economic problems and place a strong focus on the fisheries sector and maritime economy in general. Since 2004, the R3M initiative in Macaronesia (Macaronesia Marine and Maritime Network) aims to improve marine environmental observations in the region in order to better understand environmental changes and their socio-economic impacts. The session aimed to intensify joint oceanographic observations in the region. Scientists were reviewing existing oceanographic capacities in the region and discussed potential synergies between these. One idea is to synchronize different time-series efforts in the region by harmonizing sampling protocols and intervals wherever possible. This would have to go along with improvements in data sharing and management.



*Figure 3 – Many contributions to the discussion were made during the PREFACE/AWA and Macaronesian sessions.*

Due to limited capacities in the region, suggestions were made to join forces in ocean observation by conducting joint research expeditions in the area. As a concrete outcome of this session, a first Macaronesian expedition including participants from this session will take place in spring 2019 that connects the archipelagos with each other. Another joint expedition proposal for 2020 has been submitted already, which also includes international scientists. All participants in this session agreed that improved collaborations among Macaronesia will create a significant benefit for all parties involved.





## 2.3 Regional Marine Human Capital Development & Capacity Building Sphere

For many international observing networks that have a global scope, Africa often represents a major gap in their system. This is often due to limited observing capacities in African countries – both in terms of infrastructure as well as in term of human capital and capacities – which is not only caused by limited financial resources. Moreover, the lack of human capacities to conduct these observations as well as not well integrated science communities into international science communities cause this situation in many cases. Thus, before investing in technical developments and capacities, the human capacities need to be addressed and strengthened first. Thus, the capacity strengthening session primarily focused on how the next generation of West African scientists can be better supported by the international science community. Participants indicated that student education and training at an international level would have a significant impact in West Africa.



*Figure 4 – Dr. Corrine Almeida from Uni-CV presenting first ideas for a WASCAL marine master programme at UniCV.*

As an example, the West African Science Service Centre on Climate Change and Adapted Land-Use (WASCAL) was introduced, which heavily engages in human capacity strengthening in the West African region by organizing and funding international M.Sc. and Ph.D. programmes focusing on terrestrial sciences at the West African partner universities. The programme which includes 11 West African member countries was established in 2010 and is financed by the German ministry for Education and Research (BMBF). Recently, GEOMAR and the Universidade de Cabo Verde (Uni-CV) were asked to join and develop a marine component of WASCAL by establishing a new M.Sc. programme on “Climate Change and Marine Sciences” at Uni-CV. This idea was presented and discussed in detail during the session. Four directors of existing WASCAL graduate programmes were present during this session and contributed valuable experiences to the discussion. The scope and potential content of a marine WASCAL master programme were discussed and Cape Verde was suggested as an ideal place for hosting the master programme, due to an already established connection to the international research sphere and the existence of significant infrastructure for marine and atmospheric research and education. Participants confirmed that this connection between



the regional capacity strengthening and the international research sphere is essential for an effective master programme.

Based on the outcome of this session, a detailed concept paper including a proposed curriculum was developed jointly with Uni-CV and WP6 members afterwards. Both the SEACRIFOG stakeholder dialogue event (task 6.1) as well as the Three-Spheres Workshop (task 6.2) provided significant input for the design and implementation process of this regional effort.















### 3 Conclusion

The combination of both workshops as a single event significantly increased the scientific outcome by collecting input from a larger group of national and international experts. African countries were well represented during the workshop (13 countries in total) and also many non-African experts participated, which made the exchange between the different spheres very productive. Workshop participants went even beyond the discussions around the “Three-Spheres-Concept” workshop and proposed some concrete actions and joint initiatives. Joint marine research expeditions were proposed and the first one already took place and next ones are already on a proposal stage. The concept paper and curriculum of the WASCAL M.Sc. program was developed after the workshop, based on valuable input from the capacity strengthening session. The combination of the stakeholder dialogue event (task 6.1) and the conducted workshop (task 6.2) provides the critical mass for the development and potential implementation of the “Three-Spheres-Concept”. Next steps are to compile in more detail the information from these two events and to adequately formulate the concept with its benefits for all parties involved.



## Annex

Workshop Agenda (orange shaded field indicate SEACRIFOG engagement):

Days / Time	Sunday 12 November	Monday 13 November	Tuesday 14 November	Wednesday 15 November	Thursday 16 November	Friday 17 November	
		Atlantic Observatories Plenary sessions	Inauguration of the OSCM & Field Trip	The Regional Perspective Plenary sessions	The Regional Perspective Plenary session (morning)	Blue Growth Plenary sessions	
Morning Sessions		9:00 – 13:00 Cabo Verde Ocean Observatory (CVOO)  Talks  	09:30 – 12:30 Inauguration and Reception  	09:00 – 12:30 ICAWA 4 <sup>th</sup> edition   	09:00 – 12:30 Macaronesia Matters <ul style="list-style-type: none"><li>• Azores</li><li>• Madeira</li><li>• Canary Islands</li><li>• Cabo Verde</li></ul> 	09:00 – 11:00 Blue Growth and the Cape Verde Reality Lab  11:30 -12:30 Opening of Future Ocean Dialogue Exhibition	
		Lunch Break	Lunch Break	POGO Lunch – African Seaboard	Lunch Break	Lunch Break	
Afternoon Sessions		14:00 – 17:00 Cape Verde Atmosphere Observatory (CVAO)  Talks  	14:00 - 17:00 Field trip & site visits   	ICAWA 4 <sup>th</sup> edition & PREFACE    	14:00 - 17:00 WASCAL Graduate School (incl. GAME, MOOC)   	Macaron esia Matters cont. discussion  	14:00 – 16:30  Blue Growth and the Cabo Verde Reality Lab
Evening	17:00 – 20:00 Registration & Icebreaker	17:00 – 19:00 Posters & Drinks 19:30 POGO Dinner (by inv.)	18:00 – 20:00 Reception on R/V Maria Sibylla Merian (by invitation)		17:00 – 19:00 Conference Dinner		

Workshop participants:

		<b>Last name</b>	<b>First name</b>	<b>Affiliation</b>	<b>Country</b>	<b>City</b>
1	1	Antia	Avan	Kiel University	Germany	Kiel
2	2	Czudaj	Stephanie	Thuenen Institute	Germany	Hamburg
3	3	Fiedler	Bjoern	GEOMAR	Germany	Kiel
4	4	Fock	Heino	Thuenen Institute	Germany	Hamburg
5	5	Fomba	Khanneh Wadinga	TROPOS	Germany	Leipzig
6	6	Harrs	Soeren	IfW	Germany	Kiel
7	7	Heimann	Martin	MPI-BG	Germany	Jena
8	8	Hoving	Henk-Jan	GEOMAR	Germany	Kiel
9	9	Kiko	Rainer	GEOMAR	Germany	Kiel
10	10	Lancker	Kira	Kiel University	Germany	Kiel
11	11	Merk	Christine	IfW	Germany	Kiel
12	12	Lemke	Peter	AWI	Germany	Bremerhaven
13	13	Engelhardt	Marie	Botschaft Dakar	Germany	Dakar
14	14	Perner	Mirjam	Hamburg University	Germany	Hamburg
15	15	Quack	Birgit	GEOMAR	Germany	Kiel
16	16	Reiner	Birgit	GEOMAR	Germany	Kiel
17	17	Schmidt	Jörn	Kiel University	Germany	Kiel
18	18	Schütte	Dr. Florian	GEOMAR	Germany	Kiel
19	19	Steffen	Jan	GEOMAR	Germany	Kiel
20	20	Visbeck	Martin	GEOMAR	Germany	Kiel
21	21	Wiltshire	Karen	POGO/AWI	Germany	Bremerhaven
22	22	Winkler	Malte	IfW	Germany	Kiel
23	23	Zenk	Cordula	GEOMAR	Germany	Kiel
24	1	Azevedo	Eduardo	University of the Azores	Portugal	Angra do Heroismo
25	2	Barrera	Carlos	PLOCAN	Spain	Telde
26	3	BONNIN	Marie	IRD	France	Brest
27	4	BREHMER	Patrice	IRD Institut de Recherche pour le Developpement	France	Plouzane



28	5	BROCHIER	Timothée	IRD	France	Plouzane
29	6	Caldeira	Rui	ARDITI/OOM	Portugal	Funchal
				MARE   Marine and Environmental Sciences		
30	7	Canning-Clode	Joao	Centre	Portugal	Funchal
31	8	Capet	Xavier	LOCEAN/CNRS	France	Paris
32	9	Carpenter	Lucy	University of York	UK	York
33	10	Cianca	Andreas	PLOCAN	Spain	Telde
34	11	Cunha	Marina	Univ. de Aveiro - CESAM	Portugal	Aveiro
35	12	De la Fuente	Jesús	IUSA-ULPGC	Spain	Las Palmas
36	13	Dehairs	Frank	Vrije Universiteit Brussel	Belgium	Brussels
37	14	Fonseca Pereira Batista	Debany	Vrije Universiteit Brussel	Belgium	Brussels
38	15	Gomes	Cesaria	PhD Student - Lisbon University	Portugal	Lisbon
39	16	GONZALEZ	JOSE ANTONIO	ULPGC	Spain	Las Palmas
40	17	HERNANDEZ BRITO	José Joaquin	PLOCAN	Spain	Telde
41	18	JOUFFRE	Didier	IRD	France	
42	19	Kozlova	Lena	University of Exeter	UK	Exeter
43	20	Lee	James	University of York	UK	York
44	21	Neves	Silvana	PLOCAN	Spain	Gran Canaria
45	22	RATAO	Sara	FMB	Portugal	
46	23	Sousa Pinto	Isabel	Ciimar and University of Porto	Portugal	Porto
47	24	Squires	Freya	University of York	UK	York
48	25	Timothée	Brochier	IRD UMMISCO	France	Bondy
49	26	Vareilles, de	Mahaut	University of Bergen	Norway	Bergen
50	27	Watson	Andrew	University of Exeter	UK	Exeter
51	28	Zacarias	Simao	Institute of Aquaculture, University of Stirling	Scotland, UK	Stirling
52	1	Abu-Raya	Mara de Castro	Uni-CV	Cabo Verde	Praia
53	2	Almada	Ederio	Consultant	Cabo Verde	Mindelo
54	3	Almeida	Corrine	FECM/Uni-CV	Cape Verde	Mindelo
55	4	ALMEIDA	NUNO	Uni-CV	Cabo Verde	Mindelo
56	5	Andrade	Lara	DNEM	Cabo Verde	Mindelo





57	6	Benvindo	Fonseca	INDP	Cape verde	Mindelo
58	7	Bras	Nilson	Associacao Biologos e Investigadores (ABI-CV)	Cabo Verde	Mindelo
59	8	Brites	Iolanda	DNEM	Cabo Verde	Mindelo
60	9	BRITO	Ester	INMG	Cabo Verde	Espargos
61	10	Cabral	Tatiana	Fazenda de Camarao Cabo Verde ACE	Cabo Verde	Mindelo
62	11	Correia	Maria Auxilia	ACOPESCA	Cabo Verde	Mindelo
63	12	Correia	Sandra	INDP	Cabo Verde	Mindelo
64	13	Costa	Marcia Valadares	INDP	Cabo Verde	Mindelo
65	14	Da Cruz	Amadeu	ISCEE	Cabo Verde	Mindelo
66	15	da Cruz	Iolanda	INDP	Cabo Verde	Mindelo
67	16	Da Luz	Alciany	INDP	Cape Verde	Mindelo
68	17	Delgado	Nereida	DNEM	Cabo Verde	Praia
69	18	Delgado	Renato	INDP	Cabo Verde	Mindelo
70	19	Durao	Jandira	ABI.CV	Cabo Verde	
71	20	Evora	Aniso	INDP	Cabo Verde	Mindelo
72	21	Evora	Dario	INDP	Cabo Verde	Mindelo
73	22	Evora	Zelinda	DNEM	Cabo Verde	Mindelo
74	23	Evora Rocha	Carlos Alberto	DNEM	Cabo Verde	Mindelo
75	24	Ferreira Santos	Carlos	German Honorary Consul	Cabo Verde	Mindelo
76	25	Fonseca	Benvindo	INDP	Cabo Verde	Mindelo
77	26	Fortes	Rosiane	INDP	Cabo Verde	Mindelo
78	27	Fortes	Delvis	DNEM	Cabo Verde	Mindelo
79	28	Fragoso	Dulce	INDP	Cabo Verde	Mindelo
80	29	Freire	Sandra	Uni-CV	Cabo Verde	Praia
81	30	Freitas	Rui	FECM/Uni-CV	Cabo Verde	Mindelo
82	31	Gomes da Cruz	Joao Henrique	Fundacao Tartaruga	Cabo Verde	Boa Vista
83	32	Lima	Hortencio	DNEM	Cabo Verde	Praia
84	33	Livramento	Francisco Jorge	INDP	Cabo Verde	Mindelo
85	34	Lopes	Ivone Antonia	INDP	Cabo Verde	Mindelo
86	35	Lopes	Maria Ivone	INDP	Cabo Verde	Praia



87	36	Lopes	Evandro	FECM/Uni-CV	Cabo Verde	Mindelo
88	37	Lopes da Silva	Paulo	DNEM	Cabo Verde	Mindelo
89	38	Monteiro	Marisia	DNEM	Cabo Verde	
90	39	Medina	Anibal	PRAO-CV	Cabo Verde	Mindelo
91	40	Medina Silva	Zoraida	INDP	Cabo Verde	Mindelo
92	41	Monteiro	Ivanice	INDP	Cabo Verde	Mindelo
93	42	Monteiro	Katia	DNEM	Cabo Verde	Praia
94	43	Nascimento	Jorge	INDP	Cabo Verde	Mindelo
95	44	Neves	Luis	CVAO	Cabo Verde	Mindelo
96	45	Neves	Paula	Uni-CV	Cabo Verde	Mindelo
97	46	Neves Cruz	Anabela Maria	DNEM	Cabo Verde	Mindelo
98	47	Oliveira	David	INDP	Cabo Verde	Mindelo
99	48	Oujo	Carolina	Bios.cv	Cabo Verde	Boa Vista
100	49	PIMENTA	José	INMG	Cabo Verde	
101	50	Pinheiro	Neusa	Uni-CV	Cabo Verde	Mindelo
102	51	Pinto Almeida	António	FECM/Uni-CV	Cabo Verde	Mindelo
103	52	Pires	Nélida	DNEM	Cabo Verde	Praia
104	53	Pires Cardoso	Antonio	PRO-PESCA	Cabo Verde	Fogo
105	54	Ramos	Vito	INDP	Cabo Verde	Mindelo
106	55	Ramos	Lucileida	Uni-CV	Cabo Verde	Mindelo
107	56	Ramos	Eliana	DNEM	Cabo Verde	Praia
108	57	Ramos	Nivaldo	FMB	Cabo Verde	
109	58	RATAO	Sara	FMB	Cabo Verde	
110	59	Resende	Euclides	Fundacao Tartruga	Cabo Verde	Boavista
111	60	Rocha	Ailton	INDP	Cabo Verde	Mindelo
112	61	Rodrigues	Elizandro	INDP	Cabo Verde	mindelo
113	62	Santos Lopes	Nelson	Ass. Ponta d'Pom	Cabo Verde	Mindelo
114	63	Semedo	Gilson	DNEM	Cabo Verde	Praia
115	64	Silva	Pericles	INDP	Cabo Verde	Mindelo
116	65	Silva	Osvaldina	INDP	Cabo Verde	Mindelo



117	66	Silva	Hiliana	DNEM	Cabo Verde	PRAIA
118	67	Tavares	Victor	INDP	Cabo Verde	Praia
119	68	Veiga	Sonia	DNEM	Cabo Verde	Praia
120	69	Vieira	Nuno	INDP	Cabo Verde	Mindelo
121	70	Ramos	Nivaldo	FMB	Cabo Verde	
122	71	BATISIA	Kahbi	Guarda Costeira	Cabo Verde	
123	1	Adelegan	Janet Olatundun	WASCAL	Ghana	Accra
124	2	Adoukpe	Julien	WASCAL	Benin	Cotonou
125	3	Afagla	Kodjo	WASCAL	Togo	Lomé
126	4	Amaechina	Ebele	University of Nigeria, Nsukka	Nigeria	Nsukka
127	5	Asuquo	Francis Emile	University of Calabar	Nigeria	Calabar
128	6	BA	Aliou	IRD/CRODT	Senegal	Dakar
129	7	Balde	Bocar Sabaly	IRD/ZMT/CRODT/UCAD	Senegal	Dakar
130	8	Benson	Nsikak	Covenant University	Nigeria	Ota
131	9	Bonou	Frédéric	IRHOB/IRD	Benin	Cotonou
132	10	CAMARA	Idrissa Lamine	CNSHB	Guinea	Conakry
133	11	COELHO	Paulo	INIP	Angola	Luanda
134	12	CEESAY	Salifu	FD	The Gambia	
135	13	Diallo	Ibrahima	CNSHB	Guinea	Conakry
136	14	Diamé	Ahmed	Greenpeace	Senegal	Dakar
137	15	Diogoul	Ndagoue	IRD/CRODT	Senegal	Dakar
138	16	Coulibaby	Bakary	Greenpeace	South Africa	Johannesburg
139	17	Fall	Assane	IMROP	Mauritania	Nouadhibou
140	18	Faye	Saliou	ISRA/CRODT	Senegal	Dakar
141	19	El Ayoubi	Salaheddine	INRH	Marocco	
142	20	Folorunsho	Regina	NIOMR	Nigeria	Lagos
143	21	KABEBERI	Njeri	Greenpeace	South Africa	Johannesburg
144	22	Kane	Elimane Abou	IMROP	Mauritania	Nouadhibou
145	23	Kone	Vamara	CRO	Côte D'Ivoire	Abidjan
146	24	Kouame	Kanga Desiré	CRO	Côte D'Ivoire	Abidjan



147	25	Kouassi	Aka Marcel	CRO	Côte D'Ivoire	Abidjan
148	26	Mbaye	Adama	ISRA/CRODT	Senegal	Dakar
149	27	Midinoudewa	Houangninan Emmanuel Calèbe	IRHOB/IRD (Deputy Director)	Benin	Cotonou
150	28	Nnaemeka	Chukwuone	University of Nigeria Nsukka	Nigeria	Nsukka
151	29	Odai	Samuel	WASCAL	Ghana	
152	30	PEDRO DA SILVA	Sonia Cristina	INIP	Angola	Luanda
153	31	Sarré	Abdoulaye	CRODT ISRA	Senegal	Dakar
154	32	Sow	Bamol Ali	LOSEC/University Assane Seck	Senegal	Ziguinchor
155	33	Wiafe	George	University of Ghana	Ghana	Accra
156	1	Cotrim da Cunha	Leticia	Universidade do Estado do Rio de Janeiro	Brazil	Rio de Janeiro
157	2	Dureuil	Manuel	Dalhousie University	Canada	Halifax
158	3	SECCHI	Eduardo	FURG/BRASIL	Brazil	Rio Grande do Sul
159	4	Merino	Sonia	Ministry of Education	El Salvador	San Salvador
160	5	Peters	Andrew	BIOS	Bermuda	St. George's
161	6	Schacher	Jillian	Operation Wallacea	USA	Boston
162	7	Vital	Helenice	UFRN, alumna of Kiel Marine Science	Brazil	Natal
163	8	Wallace	Douglas	Dalhousie University	Canada	Halifax

